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June 17, 2003

Date

Kay Nutt

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant:	Kin Li et al.	Group Art Unit:	1765
Application No.:	09/732,425	Examiner:	S. Ahmed
Filing Date:	12/7/2000	Docket No.:	94-348D
		Date:	June 17, 2003
For:	Surface Modification Using an Atmospheric Pressure Glow Discharge Plasma Source		

Mail Stop Appeal Brief - Patents  
Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

BRIEF ON APPEAL

Sir:

Applicant files three copies of this Brief on Appeal within six months following filing a Notice of Appeal on January 22, 2003. Please charge the fee of \$320.00 under 37 C.F.R. §1.17(f) to Deposit Account No. 02-2960. Please charge the fee of \$930.00 for a three-month extension from March 22, 2003 to June 22, 2003. If Applicant owes any other fee, please charge that fee to Deposit Account 02-2960. Please treat this paper (and

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any future reply) as incorporating a petition for extension of time for the appropriate length of time, in the event that an extension is required.

#### I. REAL PARTY IN INTEREST

The real party in interest in this appeal is The Boeing Company.

#### II. RELATED APPEALS AND INTERFERENCES

Applicant does not know of any other appeals or interferences that directly affect or will be directly affected by the Board's decision in this appeal.

#### III. STATUS OF CLAIMS

1. Claims pending: 2, 5
2. Claims canceled: None
3. Claims withdrawn from consideration but not canceled: None
4. Claims allowed: None
5. Claims rejected: None
6. Claims on appeal: 2, 5

#### IV. STATUS OF AMENDMENTS

Applicant filed an Amendment After Final Rejection on December 16, 2002, which the Examiner entered.

#### V. SUMMARY OF INVENTION

As described at page 4, line 28 through page 5, line 19, the present invention has a number of distinct advantages in the use of the atmospheric pressure plasma as opposed to one in a vacuum chamber. Its compact packaging makes it portable and easily reconfigurable, it eliminates the need for high priced vacuum chambers and pumping systems, it can be scaled up

with very little additional cost, it can be installed in a variety of environments without any facilitization needs and its operating costs and maintenance requirements are minimal.

The present invention is a method for producing stable atmospheric pressure glow discharge plasmas using RF excitation and the use of said plasmas for modifying the surface layer of materials. The plasma generated by this process and its surface modification capability depend on the type of gases used and their chemical reactivity. These plasmas can be used for a variety of applications, including etching of organic material from the surface layer of inorganic substrates, as an environmentally benign alternative to industrial cleaning operations which currently employ solvents and degreasers, as a method of stripping paint from surfaces, for the surface modification of composites prior to adhesive bonding operations, for use as a localized etcher of electronic boards and assemblies and in microelectronic fabrication, and for the sterilization of tools used in medical applications.

#### VI. ISSUES

Claims 2 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacob (4,976,920) in view of Gut Boucher (4,207,286 or Roth et al. (5,414,324).

#### VII. GROUPING OF CLAIMS

Each claim stands separately; arguments for the patentability of each claim appear in the Argument section.

#### VIII. ARGUMENT

##### Rejections under 35 U.S.C. 103(a)

Claims 2 and 5 are rejected over the primary reference Jacob ('920) in view of Gut Boucher ('286) or Roth et al. ('324).

The primary reference Jacob ('920) is directed to a multitude of different types of chambers (see the 20 examples, Col. 16-20) within which the materials to be sterilized are placed (Col. 2, lines 48-61). Jacob ('920) is in complete contrast to the method of claim 2

which defines with specificity "utilizing (1) the portion of the plasma that spills out of the small chamber for (2) localized sterilization of cavities, small access holes...."

This method of sterilization is not believed made obvious by the cumulative teachings of the secondary references Gut Boucher ('286) or Roth et al. ('324); in fact, while the '286 reference is primarily directed to seeding or adding aldehydes to a gas plasma, tunnels or metal housing are used (see Col. 10, line 66 and Col. 12, line 39) in contrast to the method of claim 2.

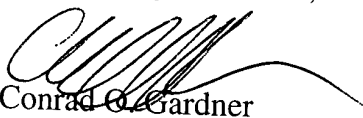
A further secondary reference ('324) is concerned with plasma generation between parallel plate electrodes with impedance matching networks and not suggestive of the method of claim 2.

Claim 5, dependent from claim 2 is believed further patentable as claim 2 within the meaning of 35 U.S.C. 103(a) and further specifies the method step of "increasing" the ionization ratio.

## IX. CONCLUSION

Applicant believes the board of Appeals will find applicants' contribution to the advancement of sterilization of medical devices as defined by method claims 2 and 5 to be worthy of Letters Patent.

Respectfully submitted,

  
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## IX. APPENDIX

*The appealed claims are:*

2. A method of operating an atmospheric pressure plasma source comprising the steps of:  
  
coupling an r.f. power supply through a coaxial transmission line to a suitably designed tuning network;  
  
coupling said network to a small plasma chamber having suitable electrodes located within;  
  
coupling a gas manifold that provides a suitable mixture of oxygen and a noble gas to said small plasma chamber; and,  
  
utilizing the portion of the plasma that spills out of the small chamber for localized sterilization purposes, including cavities, small access holes, and other hard-to-reach places.
5. The method according to Claim 2 including the further step of providing a magnetic field in the plasma region for increasing the ionization ratio.